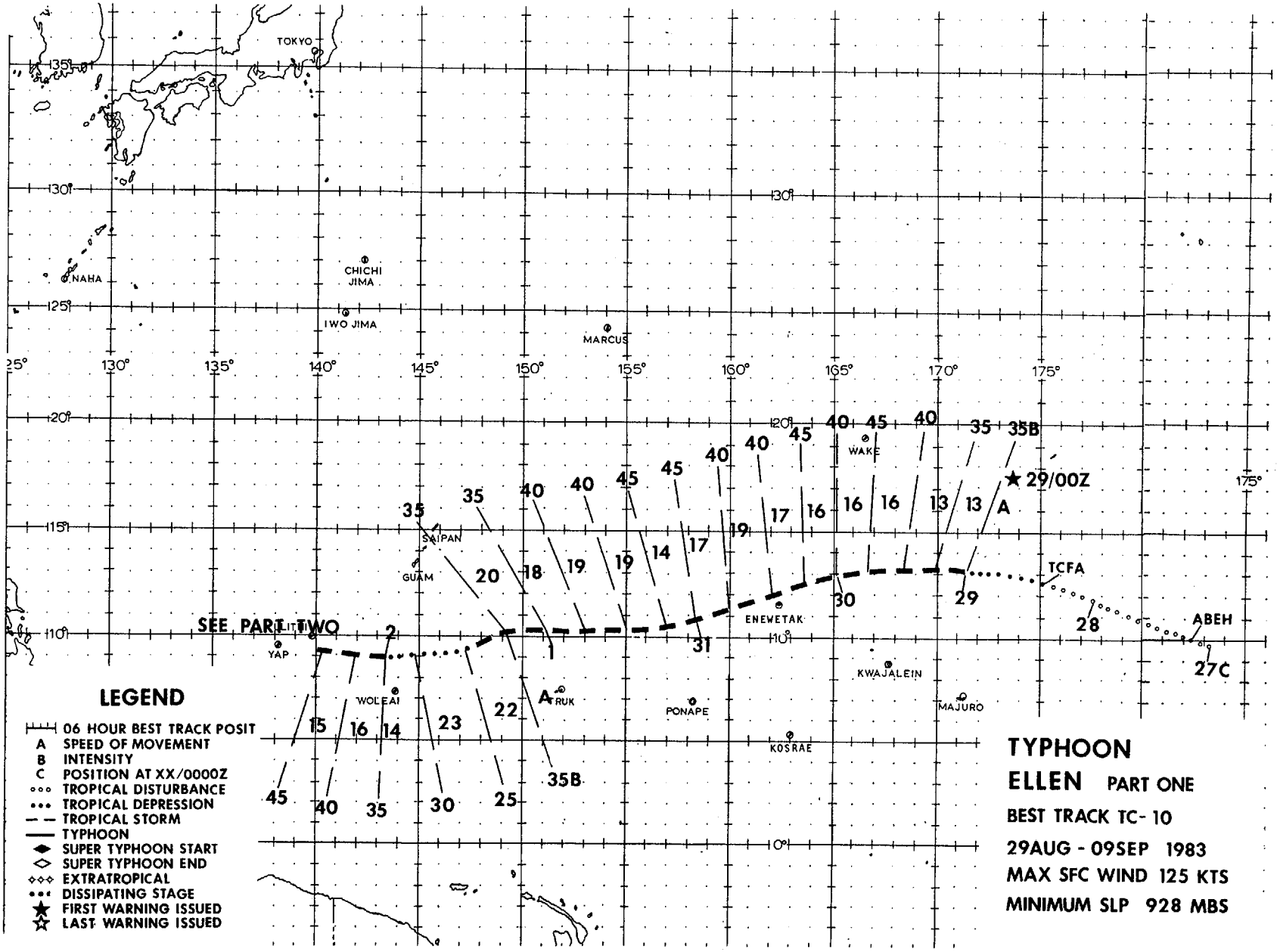


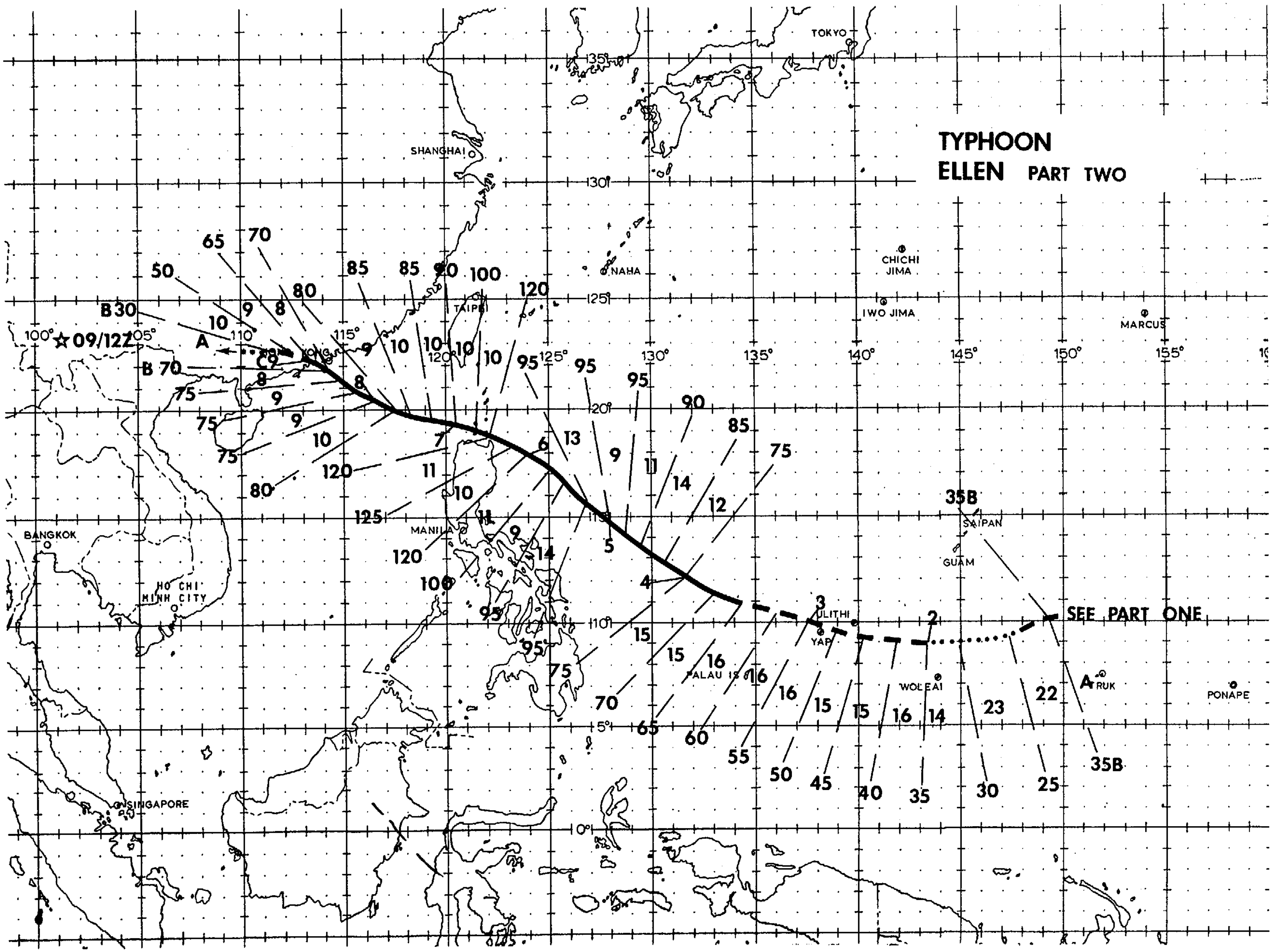
TYPHOON ELLEN PART ONE

BEST TRACK TC-10

29AUG - 09SEP 1983

MAX SFC WIND 125 KTS

MINIMUM SLP 928 MBS


TYPHOON
ELLEN PART TWO
TOKYO
SHANGHAI
NAHA
TAIPEI
CHICHI JIMA
IWO JIMA
MARCUS
SAIPAN
GUAM
MANILA
BANGKOK
HO CHI MINH CITY
SINGAPORE
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
PONAPE
SEE PART ONE
☆09/12Z

Typhoon Ellen first became apparent on satellite imagery as a tropical disturbance located near 10N 170W on the 26th of August. The disturbance was located in a data-sparse area, making it difficult to estimate its degree of organization or intensity. Satellite intensity estimates using the Dvorak method indicated maximum sustained winds of 30 kt (15 m/s). These estimates were based primarily on the presence of upper-level banding features. Because of its impressive appearance on satellite imagery, the disturbance was mentioned in the Significant Tropical Weather Advisory (ABEH PGTW) on the 27th. At this time, the disturbance was not located in the JTWC area of responsibility (AOR) but it was moving westward and it was becoming a matter of increasing concern to interests in the eastern portion of the JTWC AOR.

The disturbance crossed the dateline and entered the JTWC AOR on the 28th. A TCFA was issued at 281100Z as the system, now associated with a weak upper-level anticyclone, continued moving westward. Satellite imagery indicated that the disturbance was intensifying with maximum sustained winds of 35 kt (18 m/s). This prompted the issuance of the first warning on Ellen at 290000Z which projected continued west-northwestward movement and intensification.

During the next five days, Ellen's intensity fluctuated between 25 and 45 kt (13-23 m/s). Further development during this period was inhibited by the lack of low-level westerly inflow and the restriction of upper-level outflow channels to the north by a large upper-level anticyclone centered south of Japan. This large upper-level anticyclone was a manifestation of an intense cell of high pressure which extended throughout the troposphere and had a tremendous impact on Ellen. In addition to interferring with Ellen's outflow at upper-levels, it prevented continued west-northwestward movement and caused Ellen to assume a southwestward track around its southern periphery at speeds of 13 to 23 kt (7-12 m/s). This high speed of movement, combined with outflow restrictions, caused Ellen to weaken to tropical depression intensity briefly on the 1st of September.

After reaching a minimum intensity of 25 kt (13 m/s) at 011200Z, Ellen began to strengthen, reaching typhoon intensity two days later at 031200Z. Upper-level flow patterns during this period were very favorable for the development of outflow channels. A TUTT cell over the South China Sea (Figure 3-10-1) was instrumental in providing the proper environment for the establishment of outflow to the north. Coincident with Ellen's intensification was a change in track from west-southwestward to west-northwestward. This marked Ellen's transit beyond the southernmost point of the massive high previously discussed.

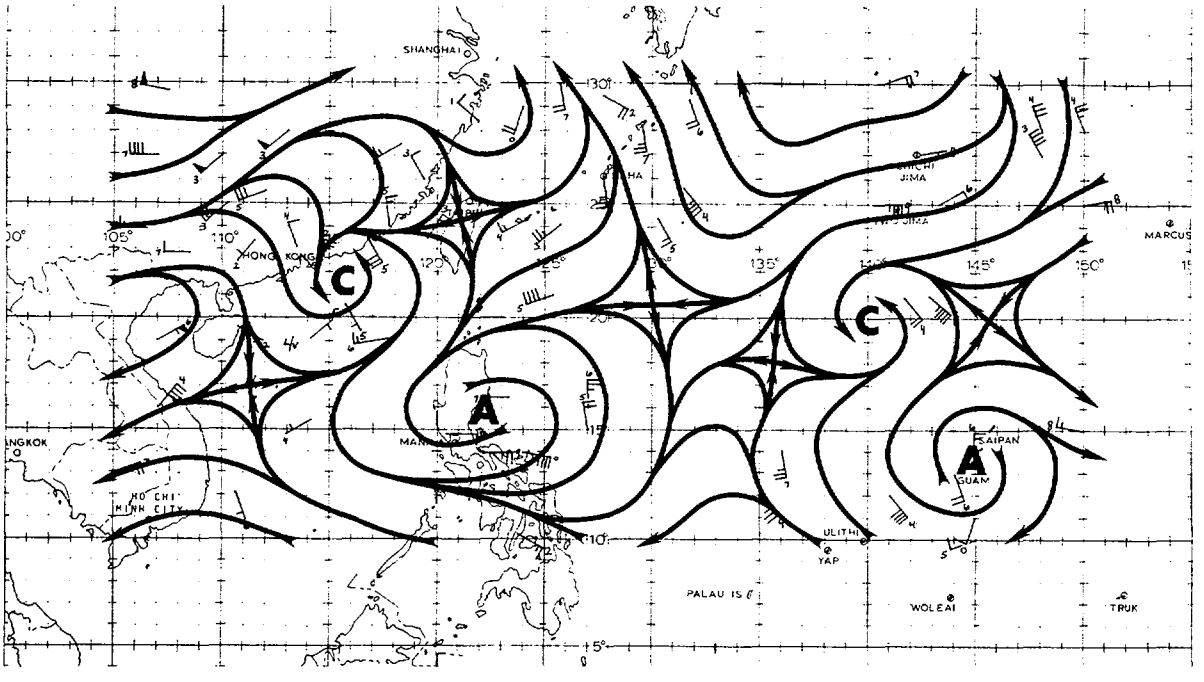


Figure 3-10-1. Favorable upper-level conditions led to Ellen's reintensification after weakening to a tropical depression on 1 September (021200Z September 200 mb analysis).

By 051200Z, Ellen was located 200 nm (370 km) east of Luzon with maximum sustained winds of 95 kt (49 m/s). An objective technique for forecasting the onset of explosive deepening (Dunnavan, 1981) indicated that Ellen would deepen rapidly over the next 34 hours. The reliability of this technique was verified when Ellen's central pressure dropped 28 mb to 928 mb over the next 12 hours. Ellen reached maximum intensity of 125 kt (64 m/s) shortly thereafter, at 060600Z (Figure 3-10-2).

This peak in intensity was short-lived due to interaction between the southern part of Ellen's circulation and Luzon. Ellen weakened continuously from this point on as it moved through the Luzon Straits and headed for southern China.

Fix information on Ellen was exceptionally good. In addition to normal aircraft reconnaissance, three fixes a day from the 3rd to the 7th were provided by an aircraft flying special aircraft stress test penetrations. This aircraft and crew were from the 53rd Weather Reconnaissance Squadron at Keesler AFB, Mississippi. In addition to supplemental aircraft reconnaissance flights, radar coverage of Ellen by land stations was extensive. Radar reports from Aparri, P.I. (WMO 98231), Kaohsiung, China (WMO 46744) and the Royal Observatory, Hong Kong (WMO 45005) provided nearly continuous coverage from the Luzon Straits to landfall near Macao.

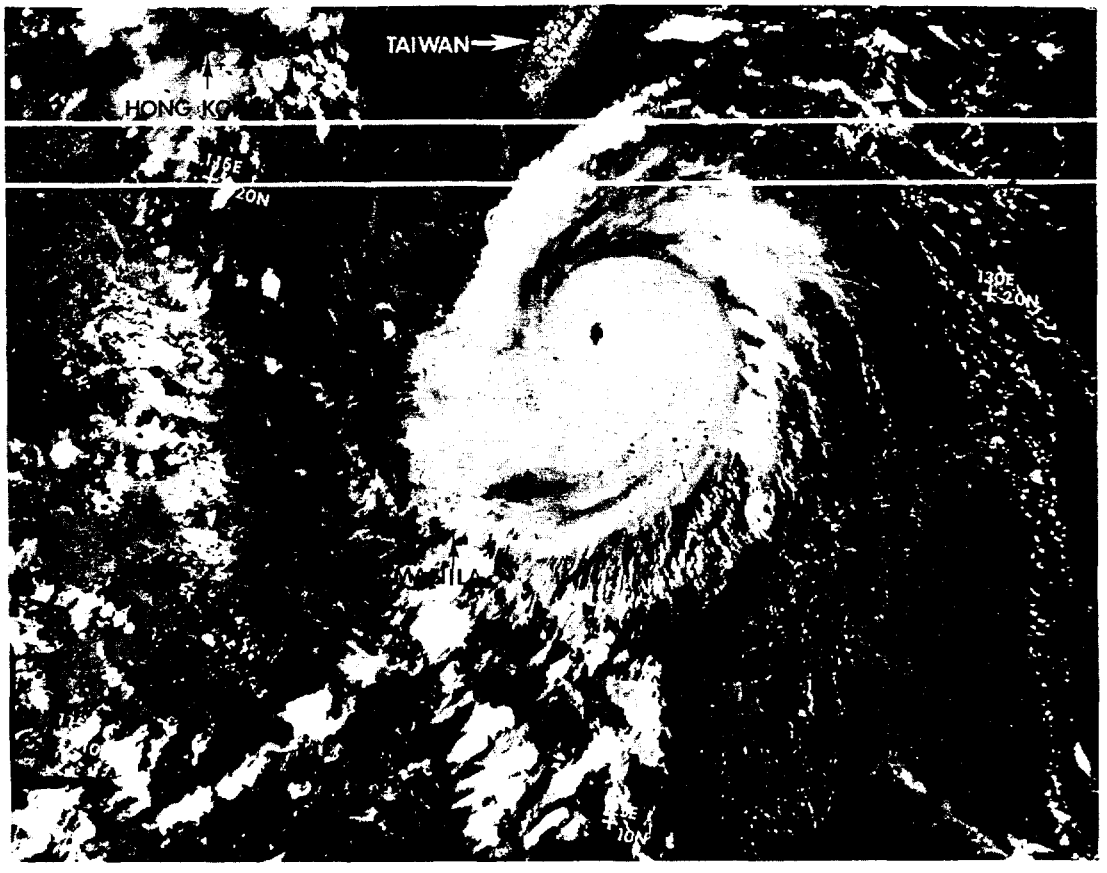


Figure 3-10-2. Typhoon Ellen at maximum intensity (0606532 September NOAA 7 visual imagery).

Ellen made landfall just south of Macao at 0000Z on the 9th of September. Maximum sustained winds at landfall were 65 kt (33 m/s) with gusts to 80 kt (41 m/s). Higher winds due to channelling effects were recorded at the Royal Observatory, Hong Kong, with the highest reported at 90 kt (46 m/s) gusting to 140 kt (72 m/s).

Damages in Hong Kong were extensive. Preliminary reports indicated that six people were killed and 277 were injured, with 120 requiring hospitalization. More than 1,600 people sought emergency shelter, mostly residents of makeshift hillside dwellings swept away by high winds, flooding, and landslides. Damages to shipping were also extensive. The Hong Kong Marine Department reported that 22 ships ran aground during Ellen's passage.

After moving inland, Ellen dissipated rapidly, becoming a 30 kt (15 m/s) tropical depression within 12 hours after making landfall.